

## REMARKS

Applicant respectfully requests reconsideration of this application in view of the following remarks. For the Examiner's convenience and reference, Applicant's remarks are presented in substantially the same order in which the corresponding issues were raised in the Office Action.

As a preliminary matter, Applicant affirms the provisional election made by Mr. Edwin Taylor on July 25, 2005, during a telephonic conversation with the Examiner, to prosecute the claims of Group I, including claims 1-7 and 15-29.

### Status of the Claims

Claims 1-29 are pending. Claims 8-14 are withdrawn. Claims 1, 15, and 22-24 are currently amended to more clearly define pre-existing claim limitations. No claims are canceled. No claims are added. No new matter has been added.

### Summary of the Office Action

The drawings are objected to and must show every feature of the claims.

Claim 22 stands rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as his invention.

Claims 1-3 and 7 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,226,278 to Broder et al. (hereinafter "Broder") in view of U.S. Patent No. 4,171,015 to Bucey et al. (hereinafter "Bucey").

Claims 4-6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Broder in view of Bucey and further in view of U.S. Patent No. 3,394,736 to Pearson (hereinafter "Pearson").

Claims 23-24, 26-27, and 29 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Broder in view of Pearson.

Claims 15-21 and 25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Broder in view of Pearson and further in view of U.S. Patent No. 6,900,990 to Tomioka (hereinafter "Tomioka").

Claim 28 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Broder in view of Pearson and further in view of U.S. Patent No. 5,613,523 to Klawuhn et al. (hereinafter “Klawuhn”).

#### Response to Objections

The drawings stand objected to because every feature of the claims must be shown. In particular, the Office Action states that “means for reducing the distance from the top of the heat exchanger tube to the bottom. . .” of claim 22 must be shown or the feature(s) canceled from the claims. Applicant respectfully submits that claim 22 has been amended to more clearly recite “the means for providing a uniform temperature distribution comprises the heat exchanger tube, wherein the heat exchanger tube is a flattened tube,” which is shown in the drawings. Applicant appreciates the Examiner’s recommendation and respectfully requests that the objection to the drawings be withdrawn.

#### Response to Rejections under 35 U.S.C. § 112, second paragraph

The Office Action rejected claim 22 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as his invention. In particular, the Office Action states that the machine press is not a component of the thermal management system. Applicant respectfully submits that claim 22 has been amended to more clearly recite “the means for providing a uniform temperature distribution comprises the heat exchanger tube, wherein the heat exchanger tube is a flattened tube,” which is definite and supported by the specification. Applicant appreciates the Examiner’s recommendation and respectfully requests that the rejection of claim 22 under 35 U.S.C. § 112, second paragraph, be withdrawn.

#### Response to Rejections under 35 U.S.C. § 103(a)

The Office Action rejected claims 1-7, 15-21, and 23-28 under 35 U.S.C. § 103(a) as being unpatentable over Broder, Brucey, Pearson, Tomioka, Klawuhn, or a combination thereof. Applicant respectfully requests withdrawal of these rejections

because the combination of cited references fails to teach or suggest all of the limitations of the claims.

#### CLAIMS 1-7

Claim 1 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Broder in view of Bucey. Applicant respectfully submits that claim 1 is patentable over the combination of cited references because the combination does not teach or suggest all of the limitations of the claim. Claim 1, as amended, recites:

mobile computing device, comprising:

a processor; an evaporator thermally coupled to the processor, wherein a working fluid of the evaporator picks up heat generated by the processor; and

a heat exchanger coupled to the evaporator to remove heat from the mobile computing device, wherein the heat exchanger comprises a flattened tube and a plurality of fins coupled to the outside of the tube, wherein **the plurality of fins extend around the tube.**

(Emphasis added).

In support of the rejection, the Office Action states, in part:

. . . Broder et al. fails to teach that the heat exchanger comprises a flattened tube and a plurality of fins coupled to the outside of the tube. Bucey et al. teaches a heat exchanger tube (48) comprising a flattened tube (As illustrated in Fig 1) and **a plurality of fins (16) coupled to the outside of the tube.** It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the heat exchanger of Broder et al. with the flattened tube and fins of Bucey et al. Replacing the heat exchanger (26) of Broder et al. with the flat tube and fin construction of Bucey et al. would reduce manufacturing complexities involved in producing round tubes which are taught by Broder et al. in Fig 3 (Bucey; Column 1, Lines 28-33). Additionally, the need for a separately manufactured heat sink would no longer be required reducing manufacturing costs.

Office Action, August 3, 2005, p. 5 (emphasis added).

Applicant respectfully submits that the cited combination of prior art fails to teach or suggest all of the limitations of the claim. In particular, Broder and Bucey, either alone or in combination, do not teach or suggest a plurality of fins extend around the tube.

Broder is directed to an apparatus for cooling a heat generating component in a computer. Broder, Abstract. The Office Action correctly recognizes that Broder does not

teach a plurality of fins coupled to the outside of the tube. Office Action, August 3, 2005, p. 5. Therefore, Broder cannot teach or suggest a plurality of fins extend around the tube.

Bucey is directed to a corrugated heat exchanger tube. Bucey, Abstract. The corrugated heat exchanger tube is formed by folding metal to define an internal fluid passageway within the tube and ribs on the top and bottom of the tube. Bucey, col. 3, lines 6-56. Bucey merely teaches ribs on opposite sides of the parallel planes of the tube. However, Bucey does not teach or suggest a plurality of fins extend around the tube.

In contrast, claim 1 recites “the plurality of fins extend around the tube.” For the reasons stated above, Broder and Bucey, either alone or in combination, fail to teach or suggest all of the limitations of the claim. In particular, the cited references do not teach or suggest the plurality of fins extend around the tube. Given that the cited references fail to teach or suggest all of the limitations of the claim, Applicant respectfully submits that claim 1 is patentable over the cited references. Accordingly, Applicant requests that the rejection of claim 1 under 35 U.S.C. § 103(a) be withdrawn.

Given that claims 2-7 depend from independent claim 1, which is patentable over the cited references, Applicant respectfully submits that dependent claims 2-7 are also patentable over the cited references. Accordingly, Applicant requests that the rejection of claims 2-7 under 35 U.S.C. § 103(a) be withdrawn.

#### CLAIMS 23- 29

Claim 23 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Broder in view of Pearson. Applicant respectfully submits that claim 23 is patentable over the combination of cited references because the combination does not teach or suggest all of the limitations of the claim. Claim 23, as amended, recites:

A heat exchanger, comprising:

a tube having n **internal fins integral with the tube** to provide an even temperature distribution to the working fluid inside of the tube, wherein n is an integer greater than or equal to one; and

a plurality of fins coupled to the outside of the tube to help remove heat from the tube.

(Emphasis added).

In support of the rejection, the Office Action states, in part:

. . . Broder et al. fails to teach that the tube has n internal fins to provide an even temperature distribution to the working fluid inside of the

tube, wherein n is an integer greater than or equal to one. Pearson teaches a tube (10) having n **internal fins (20)** to provide an even temperature distribution to the working fluid inside of the tube, wherein n is an integer greater than or equal to one. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the fin insert of Pearson with the fins (26a) and thermal management system of Broder et al. to provide an improved heat transfer medium flow through the tube (Pearson; Column 2, Lines 64-67). Providing improved heat transfer increases the cooling of the CPU and therefore increases the operation of the mobile computer.

Office Action, August 3, 2005, p. 7 (emphasis added).

Applicant respectfully submits that the cited combination of prior art fails to teach or suggest all of the limitations of the claim. In particular, Broder and Pearson, either alone or in combination, do not teach or suggest internal fins integral with the tube.

Broder is directed to an apparatus for cooling a heat generating component in a computer. Broder, Abstract. The Office Action correctly recognizes that Broder does not teach internal fins. Office Action, August 3, 2005, p. 7. Therefore, Broder cannot teach or suggest internal fins integral with the tube.

Pearson is directed to a tube having a separate finned member inserted into the tube. Pearson, Abstract. The finned member is formed of a hard metal to permit an interference fit inside the tube. Pearson, col. 3, lines 52-55. In other words, the finned member is not integral with the tube. Therefore, Pearson does not teach or suggest internal fins integral with the tube.

In contrast, claim 23 recites “internal fins integral with the tube.” For the reasons stated above, Broder and Pearson, either alone or in combination, fail to teach or suggest all of the limitations of the claim. In particular, the cited references do not teach or suggest internal fins integral with the tube. Given that the cited references fail to teach or suggest all of the limitations of the claim, Applicant respectfully submits that claim 23 is patentable over the cited references. Accordingly, Applicant requests that the rejection of claim 23 under 35 U.S.C. § 103(a) be withdrawn.

Given that claims 24-29 depend from independent claim 23, which is patentable over the cited references, Applicant respectfully submits that dependent claims 24-29 are also patentable over the cited references. Accordingly, Applicant requests that the rejection of claims 24-29 under 35 U.S.C. § 103(a) be withdrawn.

## CLAIMS 15-20

Claim 15 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Broder in view of Pearson and further in view of Tomioka. Applicant respectfully submits that claim 15 is patentable over the combination of cited references because the combination does not teach or suggest all of the limitations of the claim. Claim 15, as amended, recites:

A thermal management system of a computer system, comprising:  
a heat generating component;  
a cold plate coupled to the component to remove heat from the component, wherein the heat is transported via a working fluid; and  
a pump coupled to the cold plate to transport the working fluid from the cold plate to a heat exchanger, wherein the heat exchanger comprises **a flattened tube and a tube filling that closely fits the tube.**  
(Emphasis added).

In support of the rejection, the Office Action states, in part:

. . . Broder et al. fails to teach a pump coupled to the cold plate to transport the working fluid from the cold plate to a heat exchanger, wherein the heat exchanger comprises a tube filling that closely fits the tube. . . .

. . . With respect to the heat exchanger comprising a tube filling, Pearson teaches the use of **a fin insert (18) designed to be inserted into a tube (10)** as illustrated in Figs 1, 2. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the fin insert of Pearson with the heat exchanger (26) and thermal management system of Broder et al. to provide an improved heat transfer medium flow through the tube (Column 2, Lines 64-67). Providing improved heat transfer increases the cooling of the CPU and therefore increases the operation of the mobile computer.  
Office Action, August 3, 2005, p. 9 (emphasis added).

Applicant respectfully submits that the cited combination of prior art fails to teach or suggest all of the limitations of the claim. In particular, Broder, Pearson, and Tomioka, either alone or in combination, do not teach or suggest a flattened tube and a tube filling that closely fits the tube.

Broder is directed to an apparatus for cooling a heat generating component in a computer. Broder, Abstract. The Office Action correctly recognizes that Broder does not teach a tube filling. Office Action, August 3, 2005, p. 9. Additionally, Broder does not teach or suggest a flattened tube. Therefore, Broder cannot teach or suggest a flattened tube and a tube filling that closely fits the tube.

Pearson is directed to a tube having a separate finned member inserted into the tube. Pearson, Abstract. The finned member is formed of a hard metal to permit an interference fit inside the tube. Pearson, col. 3, lines 52-55. However, Pearson does not teach or suggest a flattened tube and a tube filling that closely fits the tube.

Tomioka is directed to a liquid cooled computer system. Tomioka, Abstract. One example of the cooling unit includes a pump. Tomioka, col. 7, line 66, to col. 8, line 7. However, Tomioka does not teach or suggest a flattened tube and a tube filling that closely fits the tube.

In contrast, claim 15 recites “a flattened tube and a tube filling that closely fits the tube.” For the reasons stated above, Broder, Pearson and Tomioka, either alone or in combination, fail to teach or suggest all of the limitations of the claim. In particular, the cited references do not teach or suggest a flattened tube and a tube filling that closely fits the tube. Given that the cited references fail to teach or suggest all of the limitations of the claim, Applicant respectfully submits that claim 15 is patentable over the cited references. Moreover, the claim is patentable over the cited references because there is the Office Action fails to establish a motivation to combine the references with respect to a flattened tube and a tube filling that closely fits the tube. Accordingly, Applicant requests that the rejection of claim 15 under 35 U.S.C. § 103(a) be withdrawn.

Given that claims 16-20 depend from independent claim 15, which is patentable over the cited references, Applicant respectfully submits that dependent claims 16-20 are also patentable over the cited references. Accordingly, Applicant requests that the rejection of claims 16-20 under 35 U.S.C. § 103(a) be withdrawn.

#### CLAIMS 21-22

Claim 21 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Broder in view of Pearson and further in view of Tomioka. Applicant respectfully submits that claim 21 is patentable over the combination of cited references because the combination does not teach or suggest all of the limitations of the claim. Claim 21, as amended, recites:

A thermal management system, comprising:  
means for providing a **uniform temperature distribution** of  
working fluid within a heat exchanger tube; and  
means for removing heat from a computer system.  
(Emphasis added).

In support of the rejection, the Office Action states, in part:

With respect to claims 15 and 21, Broder et al. teaches a thermal management system of a computer system, comprising: a heat generating component (20), a cold plate (31) coupled to the component to remove heat from the component (As illustrated in Fig 3), wherein the heat is transported via a working fluid. Broder et al. fails to teach a pump coupled to the cold plate to transport the working fluid from the cold plate to a heat exchanger, wherein the heat exchanger comprises a tube filling that closely fits the tube. Tomioka teaches a pump (72) coupled to a cold plate (71) to transport working fluid from the cold plate to a heat exchanger (32/41). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the pump of Tomioka with the thermal management system of Broder et al. to provide greater circulation to the liquid coolant to **improve cooling performance of the processor** (Tomioka; Column 1, Lines 54-58).

With respect to the heat exchanger comprising a tube filling, Pearson teaches the use of a fin insert (18) designed to be inserted into a tube (10) as illustrated in Figs 1, 2. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the fin insert of Pearson with the heat exchanger (26) and thermal management system of Broder et al. to provide an **improved heat transfer medium flow through the tube** (Column 2, Lines 64-67). Providing improved heat transfer increases the cooling of the CPU and therefore increases the operation of the mobile computer.  
Office Action, August 3, 2005, p. 9 (emphasis added).

Applicant respectfully submits that the cited combination of prior art fails to teach or suggest all of the limitations of the claim. In particular, Broder, Pearson and Tomioka, either alone or in combination, do not teach or suggest means for providing a uniform temperature distribution.

Broder, Pearson, and Tomioka all generally address cooling systems. The Office Action may be correct in stating that Tomioka provides improved cooling performance and Pearson provides improved heat transfer medium flow, but the disclosures of Broder, Pearson, and Tomioka are insufficient to teach or suggest a uniform temperature distribution, as recited in the claim.



In contrast, claim 21 recites “a uniform temperature distribution.” For the reasons stated above, Broder, Pearson and Tomioka, either alone or in combination, fail to teach or suggest all of the limitations of the claim. In particular, the cited references do not teach or suggest a uniform temperature distribution. Given that the cited references fail to teach or suggest all of the limitations of the claim, Applicant respectfully submits that claim 21 is patentable over the cited references. Moreover, the claim is patentable over the cited references because there is the Office Action fails to establish a motivation to combine the references with respect to a uniform temperature distribution. Accordingly, Applicant requests that the rejection of claim 21 under 35 U.S.C. § 103(a) be withdrawn.

Given that claim 22 depends from independent claim 21, which is patentable over the cited references, Applicant respectfully submits that dependent claim 22 is also patentable over the cited references.

### CONCLUSION


It is respectfully submitted that in view of the amendments and remarks set forth herein, the rejections and objections have been overcome. If the Examiner believes a telephone interview would expedite the prosecution of this application, the Examiner is invited to contact Jeffrey Holman at (408) 720-8300.

If there are any additional charges, please charge them to Deposit Account No. 02-2666.

Respectfully submitted,

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